

home lawns



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HOME LAWNS

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INTRODUCTION

A well-kept lawn completes the view of a home property. It draws together the total visual effect of the architectural lines of the house to the trees, shrubbery, and garden. As well as being aesthetically pleasing, a home lawn must be durable for recreational use and require a minimum of effort to maintain. This publication outlines the general requirements for the making and maintaining of a home lawn. For special, local lawn problems consult the nearest office of Agriculture Canada, a provincial agricultural representative, or the plant science department of a university.

MAKING A NEW LAWN

Preparing the site

Remove all building debris, such as bricks, mortar, pieces of lumber, and large stones; do not bury them on the site.

Using a garden spade or shovel, check the overall depth of the available topsoil. It is very difficult to improve soil conditions after the lawn is established. To make and maintain a lawn, a minimum depth of 15 cm of good topsoil is required. If the subgrade needs changing, move all topsoil to one side.

Subgrade

Use grade stakes to establish the subgrade and the finished grade. Slope the subgrade to fall gently away from the house on all sides. Allow for at least 15 cm of topsoil next to the house and on the outside borders of the property. Try to avoid terraces and fill in all depressions. Limit the maximum slope of a terrace to less than 3:1 to facilitate mowing. A retaining wall of brick, concrete, or stone may be necessary to offset a sharp decline in grade or to protect a tree if the existing grade is raised.

Drainage

Proper grading takes care of surface drainage. To improve the drainage of impervious subsoil install a subsurface drainage system made of 10 cm drain tile or corrugated plastic drainage tubing. Lay the lines 75–90 cm deep and space them 5–8 m apart. Arrange a fall of 3–7 cm every 15 m and follow a natural grade or connect to a suitable outlet. Place gravel around the tile or tubing lines before covering them with soil.

Topsoil

Soil requirement

A loam soil is best for a new lawn and an overall depth of 15 cm is essential. This soil has excellent physical properties to ensure ample water percolation, drainage of excess moisture, sufficient oxygen for growth, and good texture for rooting. It also has medium natural fertility and is able to store and use nutrients added from commercial fertilizers or animal manures. Loam is amply supplied with soil microorganisms, which are important in organic matter breakdown, nitrogen and sulfur transformations, and nitrogen fixation.

This soil contains a good balance of clay (the smallest soil particles) and sand (the largest particles). The clay particles provide the binding action and are the seat of chemical exchange. Sand particles do not retain water and have a low nutrient holding and

exchange capability. The remaining particles, called silt, are between the clay and the sand particles in size.

Improvement of topsoil

Wet, heavy clay soils and dry sandy soils are not suitable for growing turf. However, they can be modified to make a suitable topsoil. Spread 5 cm of washed sand over the surface of a clay soil and mix it thoroughly with the surface 8 cm of soil with a rotary tiller or by hand digging. This will greatly improve the texture, drainage, and aeration. Similarly the tilth and water-holding capacity of a sandy soil can be improved by adding clay. The chemical limitations can be enhanced by thoroughly incorporating a 5 cm layer of farm manure, spent mushroom spoil, or granulated peat moss into the soil surface.



Fig. 1. A rotary tiller being used to prepare the soil for seeding.

Spreading topsoil

Spread the topsoil evenly over the subgrade to a depth of 15 cm. A simple drag ladder built of two 3 m pieces of 5 × 10 cm scrap lumber and weighted with a large stone can be used to grade and firm the soil.

Drag the ladder sideways across the area in both directions and on the diagonal. This action will move the soil from high spots into the depressions and provide a firm soil base.

Sprinkler systems

Underground sprinkler systems are available to provide supplemental water for the complete lot, including the lawn area. A sprinkler system is expensive and requires technical help at least in the planning stages. Such a system is best installed after the lot plan has been developed and the topsoil spread but before seeding.

Starter fertilizer

Broadcast enough commercial fertilizer to provide nitrogen at a rate of at least 1 kg/100 m² (see fertilizer section and guide). A good starter fertilizer is relatively high in phosphorus (the middle number of the hyphenated numerical grade listed on the package) to encourage rooting. Work the fertilizer into the surface 3 cm by raking with a steel lawn rake. Add lime only when a laboratory soil test shows that it is necessary. Roll the seedbed lightly with a lawn roller. The final seedbed should be granular yet firm, slightly moist, and on the desired grade.



Fig. 2. An auger-driven drop spreader distributing starter fertilizer.



Fig. 3. A seedbed being firmed with a lawn roller.

Seeding

Seed

Because of the expense and effort required to provide a suitable base for a permanent new lawn, buy only quality seed from a reliable source. Cheap seed or mixtures are lower in germination and vigor than quality seed and may contain more weed seed, foreign material, and unadapted grass seed.

Seeding time

The most suitable time to seed lawns in Eastern Canada is from mid-August to mid-September, but early spring is satisfactory. Spring to early June is recommended for the Prairie Provinces. Early fall and early spring are both satisfactory in British Columbia.

Mixtures

See "Notes on lawn grasses" and "Guide for lawn mixtures" for aid in selecting a suitable mixture. Because most home lawns vary from open areas to deep shaded locations, a mixture is usually more

satisfactory than any single species. The use of several cultivars and species also tends to offset the complete loss of the lawn from the ravages of diseases or insects. However, certain lawn locations, such as open play areas or home putting greens, may require specialty mixtures based on use.

Sowing seed

Seed at the rate of 1.5–2.5 kg/100 m² as recommended in the guide. For even coverage, sow half the seed on the whole area in one direction and the rest at right angles to the first. Small areas can be seeded by hand. For larger areas use an accurate, calibrated broadcast or drop seeder, which has directions to indicate the settings for various seeding rates. A seeder can usually be rented from a garden center, seed store, or household equipment rental agency. Cover the seed lightly with soil by means of a fan-shaped rake and roll the seeded area lightly.



Fig. 4. Sowing seed with a drop seeder.



Fig. 5. Covering the seed by means of a fan-shaped rake.

Mulch

On a steep slope or terrace use a mulch of chopped straw (one to two straws deep) to help establish the lawn. Remove the straw after the seed germinates and general growth is about 3 cm high. Mulches are not usually necessary on reasonably level areas.

Watering

Keep the seedbed moist, but not saturated, until the seedling grass becomes well established. To avoid washing the seed out of the soil, use frequent light sprinklings rather than occasional heavy ones.

Mowing

Cut the grass back to 4–5 cm high with a sharp mower as soon as it reaches 7 cm. Make sure that the soil is dry and firm enough to support the mower. Avoid gouging when you turn the mower.

Sodding

Sodding is more expensive than seeding but gives quicker results. It can be done at any time of the year when the soil is not frozen. Sodding is recommended for terraced slopes and banks where erosion may be a problem. If extensive areas around the house must be in turf, you can sod the front areas or those adjacent to the building and seed the outlying areas.

Use only seeded nursery sod; pasture sod usually contains coarse, undesirable grasses. Prepare the soil as for seeding. If unlaied sod is to be held for more than 8 hours, stack it in the shade or cover it with moist burlap. Lay the first row of sod close together without crowding in a straight line along a curb, driveway, or taut string. Indent the second row from the first like brickwork so that the ends alternate. Sod pieces can be cut to fit nonrectangular places by means of a sharp lawn edger, knife, or hatchet. Stake the sod laid on steep slopes. When all the sod has been laid, roll it with a lawn roller partly filled with water to ensure contact of the roots with the soil. Water thoroughly and do not allow the sod to dry out.



Fig. 6. A newly sodded lawn.

Temporary lawn

A temporary lawn may be considered when you cannot complete lawn construction requirements for the best seasonal seeding of permanent species or when the lawn area requires expensive re-grading plus topsoil for a suitable lawn. A temporary lawn provides cover and a place for children or pets to play and reduces the problem of dust or mud around the home. For such a lawn, prepare a seedbed, firm the soil, and seed to either Italian ryegrass or perennial ryegrass. A suitable seeding rate for these species is 3 kg/100 m².

MAINTAINING A LAWN

Good maintenance practices often make the difference between a good and a poor lawn. However, they cannot correct a faulty grade, poor drainage, or the use of unsuitable species. If the procedures for making a new lawn have been followed, the ultimate quality of the lawn is dependent on the level of maintenance. A good lawn requires careful programming of the feeding, watering, and mowing and is expensive. A reasonably good lawn can be maintained with moderate care and expense. A lawn maintained with a minimum of effort is inexpensive but does little to enhance the property.

A lot of turf products and equipment to facilitate lawn maintenance are available. Therefore consider the desired level of turf quality and plan a program to obtain it. Problems should be identified quickly and accurately. Seek the advice of local specialists regarding the diagnosis of a problem and the remedy. Many products are very specific as to function and application and so it is important to read all the directions carefully. Because some lawn remedies contain hazardous chemicals, store containers out of the reach of children and household pets. A recent development is the sale of products for the lawn that have more than one function. You can buy a combination herbicide and fertilizer, fungicide and fertilizer, or herbicide and fungicide plus fertilizer. Thus it is possible to control weeds and diseases and to feed the lawn by using a combination product. To obtain the best results, it is imperative that soil and weather conditions provide the proper environment for the maximum activity of all ingredients. A combination weed and feed product will not control weeds if rain falls shortly after the application of the product. A selective herbicide is only effective within a prescribed temperature range, and the treated area must be free from rain for 8 hours after the treatment. When properly used, combination products can save time, labor, and sometimes equipment but may cost more than the same products purchased separately. Most lawn nutrients, selective herbicides, and fungicides can be applied dry or as an aqueous solution. A variety of equipment is available for their application. The correct and uniform application rates combined with

proper weather conditions ensure rapid uptake and assimilation by the grass. To ensure efficacy, most products should be used in the season of purchase and not left in unheated storage over winter. Lawn maintenance is the complete care of the lawn. Although feeding, mowing, and watering are the prime objectives, weed and pest control methods and techniques to improve or control aeration and thatch are important. The aim of good maintenance is to have the turf in a slow-growing, dense, healthy condition at all times.

Fertilizers and lawn feeding

The nutritional needs of a lawn are based on the availability of the nutrients to the plants in the root zone area. Most lawns cannot grow adequately on the soil nutrient supplies and require supplemental feeding from fertilizer. For all fertilizers sold in Canada the guaranteed analyses of total nitrogen (N), available phosphoric acid (P_2O_5), and soluble potash (K_2O) are always listed in this order on the package. Thus a 32-4-8 fertilizer contains 32% total nitrogen, 4% available phosphoric acid, and 8% soluble potash. The package also states the weight of its contents and the amount to apply for a given area. You can calculate the total amount to apply and the cost per application. Apply nitrogen at no more than 0.5 kg/100 m² at any one time. Nitrogen promotes the dark green color and the growth of leaf tissue and improves the general health of the plant. Phosphorus is required for general growth, particularly of roots. Potassium aids plant vigor and may improve winterhardiness and tolerance of drought and disease. Nitrogen and potassium are readily taken up by the grasses but are easily leached from the soil. The phosphorus that is not used immediately may become fixed and be made available very slowly. Normally the secondary and minor elements are available in the soil in sufficient amounts to maintain growth.

Fertilizers can be purchased either as concentrated solutions or in dry form. Liquid formulations require a siphoning aid or proportioner to apply the correct amount with the garden hose. The chief limitations of this form are the necessary watering time to apply sufficient nutrients and the moving of the hose to another area.

The dry fertilizer forms are simply described as soluble or readily available forms, natural organic, and synthesized or so-called slow release types. The dry soluble forms are the cheapest to purchase and the nutrients are available immediately after application. They must be spread evenly at the prescribed amounts to avoid turf burning.

The natural organics are derived from sewage sludge, manures, and animal by-products. They contain less nutrients than the soluble forms, and these are made available to the turf through breakdown by the soil microorganisms. Thus their use is limited to the warmer periods of the growing season.



Fig. 7. Turf burning caused by too much nitrogen.

The slow release fertilizers are usually concentrated formulations and therefore smaller amounts are required per unit area. They are the most expensive of the dry fertilizers. High density fertilizers may also be light in weight, which facilitates their application. They contain a soluble fraction, which is readily available after application; the remaining nutrients become available over a period of 3-6 weeks. There is less danger of turf burning than with soluble fertilizers.

Application

Although the amount of fertilizer needed varies somewhat because of the climate and soil, the main consideration is the degree of turf excellence desired. A single application is considered minimal and should be applied in the spring, except for coastal British Columbia where September is considered best. Three to five applications of nitrogen per season containing a total of 3 kg/100 m² are considered ideal for a well-kept lawn. A reasonably good lawn can be obtained with an application of a complete fertilizer in the spring and the fall. At any one feeding do not apply more nitrogen than 0.5 kg/100 m².

Fertilizer spreaders

Fertilizers can be applied by hand, but a fertilizer spreader is more convenient and accurate. The auger-driven drop spreader distributes fertilizer evenly and accurately and is especially useful in confined spaces. The broadcast spreader gives a wider coverage per run than

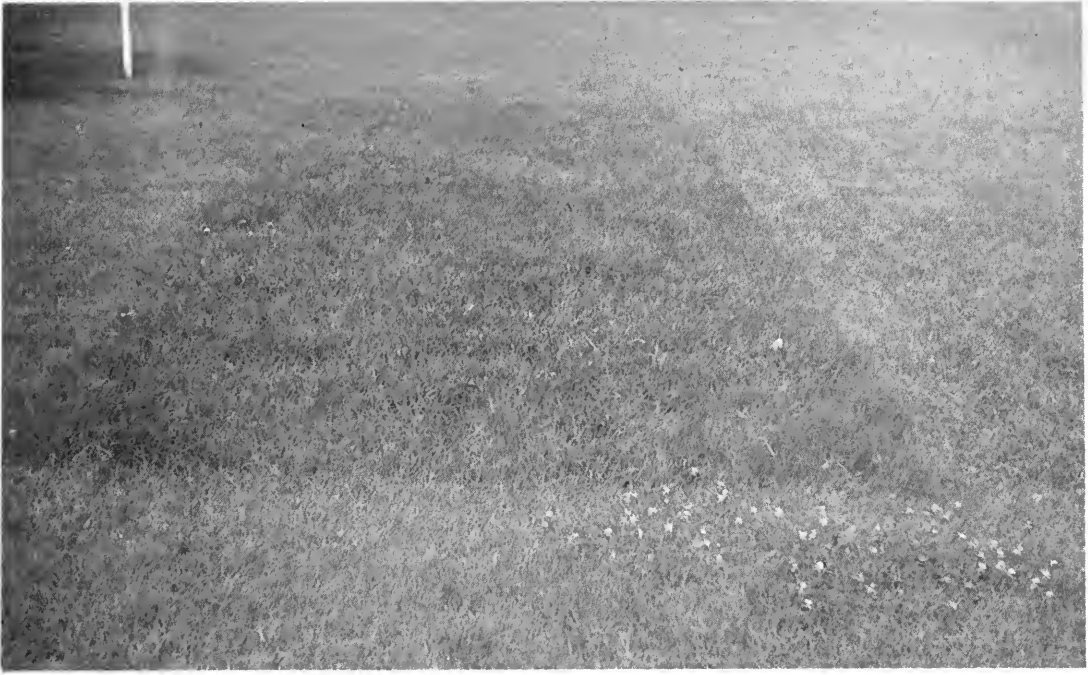


Fig. 8. Response to fertilizer.

the drop spreader. The hand-held broadcast spreader is useful and light and gives good coverage. With all spreaders be careful to avoid overlapping or leaving unfertilized strips. If the spreader is run back and forth parallel to the street, such errors are not so noticeable. Carefully set any spreader at the correct application rate. After use wash the spreader thoroughly because fertilizers are corrosive. A spreader can usually be rented from a garden center, fertilizer dealer, or household appliance rental agency.

Soil tests

Soil tests are usually unnecessary immediately after a new lawn is established. However, with areas under a high level of lawn maintenance take samples for soil tests every 5 years. Send soil samples that are representative of the site to the soils department of a provincial agricultural school or college for analysis, interpretation, and recommendations. Consult the local provincial agricultural representative regarding soil sampling and the location of soil testing facilities. Home soil testing kits can be purchased but are of little value unless the operator understands the basis of the tests and conducts the analyses with care.

Moss in lawns usually indicates low fertility, too much shade, or poor drainage. Rake out the moss and fill in the depressions with topsoil; then fertilize and reseed the area.

Lime

Apply lime only when a soil test shows it is necessary. Ground limestone is used to counteract the sourness or acidity of the soil. Clay soils require more lime than sandy soils to produce the same degree of change. Ground limestone is best applied in the fall or early spring, but it can be used at any time during the growing season. Soil that was limed when the lawn was established may require additional lime after several years. Do not use hydrated lime.

Topdressing

Topdressing is carried out on good lawns or specialty turf, such as croquet areas, putting greens, and lawn tennis courts. These areas warrant and require the time, labor, and expense of the preparation and application of a topdressing. Topdressings contain a blend of washed sand, soil, and organic materials or soil amendments in various proportions. Spread them evenly and carefully brush them into the turf surface. Consult a specialist concerning mixtures and their uses. Light soil mixtures can be added as a topdressing to gradually fill in lawn depressions, but do not add more than 2 cm of topdressing at any one time. By repeating the procedure two or three times during the growing period, most depressions can be filled without loss of turf.

Mowing

Height of cut

Mowing is an important part of good turf maintenance. Mow ordinary lawns to a height of 4–5 cm and raise the height of cut slightly during a hot, dry period. Mow often enough so that only a third of the total plant height is removed. Keep the mower blade sharp. Change mowing patterns frequently to encourage upright growth of the grass blades and to ensure an even cut. In late fall give the lawn a final mowing and rake it free of leaves.

Mowers

Reel mowers are more expensive than rotary types and are safer to operate. They work best on well-graded lawn surfaces and provide a better finish than rotary mowers. Rotary mowers are simpler to adjust and work best at high cuts and on rough lawn areas. Do not mow a lawn when it is soft and wet.

Clippings

Clippings do not have to be removed from low-maintenance lawns. If rain has prevented mowing, rake up the excessive clippings. Remove clippings from lawns that are heavily fertilized and watered because the cut leaves and stems accumulate faster than they decompose on the soil surface. This partially decomposed layer, called thatch,

restricts percolation of water and nutrients and can harbor insects and diseases and cause an unhealthy lawn.



Fig. 9. A layer of thatch on the soil surface.

Dethatching

Raking with a steel rake in the spring and fall helps prevent thatch. Look for thatch by lifting out a vertical slice of turf and soil and measuring the thickness of the layer on the soil surface. If this layer is more than 2 cm thick, dethatch the lawn. Good-quality turf benefits from annual dethatching; average lawns require this treatment only once every second or third year. A dethatching machine is too expensive for the average householder to buy but can be rented from a garden center or rental agency. This self-powered machine is equipped with sharp blades that rotate on a horizontal axle at high speeds and deposit the accumulated debris on the lawn surface. After the debris has been raked, it can be composted, deposited in the garden, or removed as garbage. The time to dethatch a lawn is in the spring or fall, when cool weather encourages lawn recovery. Never perform this operation in the heat of summer.

Aeration

Lawns developed on clay soils, especially the heavily used play areas and along sidewalks and driveways, may become thin and unthrifty. The soil surface becomes very hard and underneath it the spaces between the soil particles are compressed. This results in poor soil aeration and restricted water movement through the soil. These conditions can only be remedied by a lawn aerator. This equipment lifts and deposits on the lawn small cores about 7 cm long and 10 mm in diameter. These cores should be raked up and removed. A lawn aerator



Fig. 10. Dethatching a home lawn.

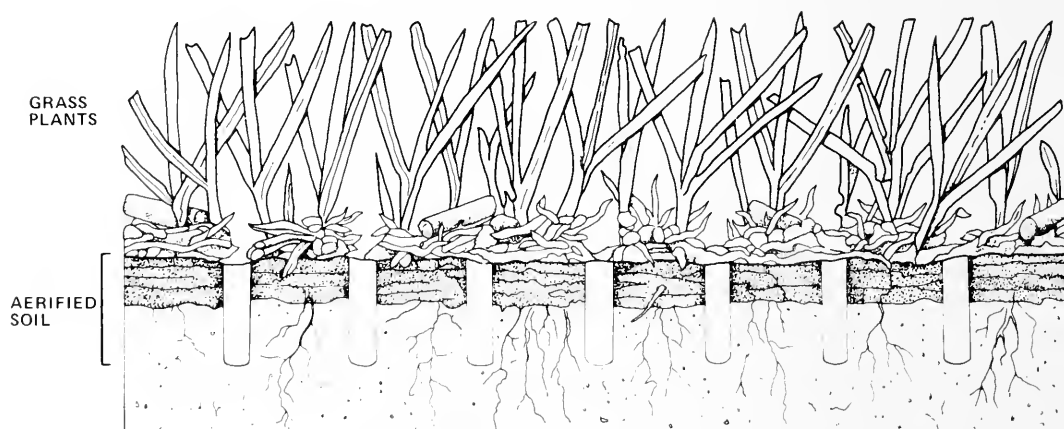


Fig. 11. A cross section of a lawn after the use of an aerator.

can be rented from a garden center or rental agency. Nutrients, water, and plant roots soon penetrate the soil through the holes to alleviate the compaction and improve the overall condition of the lawn.

Watering

Watering is necessary to maintain good quality turf. Soil moisture must be available for growth. The degree of watering varies with management and the capability of the irrigation system. When watering, wet the soil thoroughly to a depth of 10 cm. Frequent light waterings encourage shallow rooting and are harmful. By placing small cans on the lawn under the sprinkler and collecting water over a given period you can calculate the time required to add 2 cm of water. During the warm season lawns may require 2 cm of supplemental water per week. However, this amount varies across the country. Do not over water because lawn grasses do not thrive in wet soil.

Rolling

The purpose of rolling is to counteract any frost heaving of the lawn. Roll the lawn in the early spring while it is slightly moist but has had a drying period. Do not roll a lawn when the soil is wet enough to puddle. A roller partly filled with water is heavy enough to firm the heaved plants into contact with the soil. On clay soils roll carefully to avoid compaction. Rolling does not make a rough lawn smooth.

Weed control

It is difficult for weeds to invade dense, healthy turf and so they are seldom a serious problem on well-constructed and properly maintained lawns. Weeds can be troublesome on neglected areas or lawns on poor soil. Although hand pulling is practical when weeds are sparse, high weed populations require chemical treatment. If weeds continue to invade a lawn after proper chemical treatment, some other facet of maintenance is at fault and steps should be taken to remedy the failing.

Chemicals used to control weeds in established lawns are called herbicides and are applied as preemergence or postemergence treatments. Preemergence herbicides are applied before weed seeds germinate and as the seeds or seedlings begin growth they absorb enough chemical to kill them. Permanent lawn grasses are relatively unaffected. Postemergence herbicides are applied after weed seed germination when the weeds are in active growth, and such formulations do not greatly affect lawn grasses. Some chemicals are selective in that they kill only broad-leaved plants but not grass. Others are nonselective and kill both weeds and lawn grasses.

Correctly identify the weed and then select the proper chemical for control. In making this selection, consider the method of application and the necessary equipment. Timing is important. For example, dandelions may be controlled in midspring and late summer in many areas of Canada because they are growing actively and are very susceptible to selective chemicals. Choose a clear day with little or no

air movement and temperatures of 15–25°C. Such weather permits rapid absorption and uptake of the chemical with little chance of drift or spread beyond the treated area. Do not apply herbicides during excessive heat. Follow exactly the directions on the package regarding rates. Keep all containers out of the reach of children and pets. Wash your hands thoroughly after using these chemicals.

Applying herbicides

Lawn herbicides can be purchased in a dry form combined with a fertilizer or fungicide and can be applied with the described drop or broadcast spreaders. Concentrated liquid formulations are also available for application with a garden hose and proportioner or with pressure sprayers. Do not use the same sprayer for other pesticides because of the difficulty of rinsing out all traces of toxic herbicides; use separate sprayers and label them clearly. Broad-leaved weeds can also be controlled by dragging a plastic weed bar over the lawn. Small openings in the bar permit the dispersion of the selective herbicide.

Broad-leaved weeds

Dandelions and plantains can be controlled with 2,4-D or mecoprop (MCP). Other weeds such as chickweed, clovers, and black medick are more resistant to 2,4-D and require 2,4-D mixtures such as: 2,4-D plus mecoprop; 2,4-D plus dicamba; 2,4-D plus dichlorprop; 2,4-D plus fenoprop; 2,4-D plus mecoprop plus dicamba; and 2,4-D plus fenoprop plus dicamba.

Knotweeds are resistant to most herbicide mixtures, but 2,4-D plus dicamba is effective when the knotweed plants are young. Do not use this formulation near trees or shrubs. To control broad-leaved weeds in bentgrass or newly seeded areas use only mecoprop.

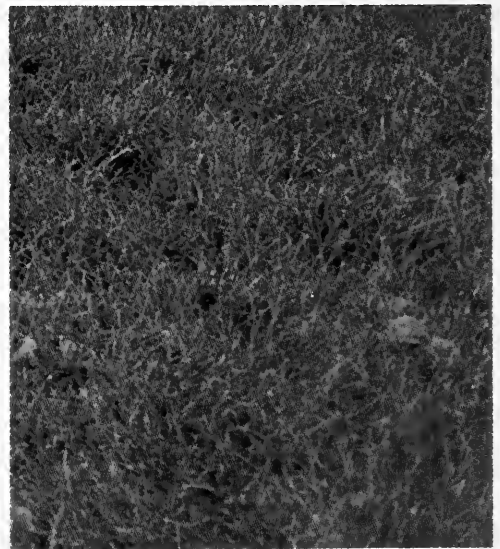
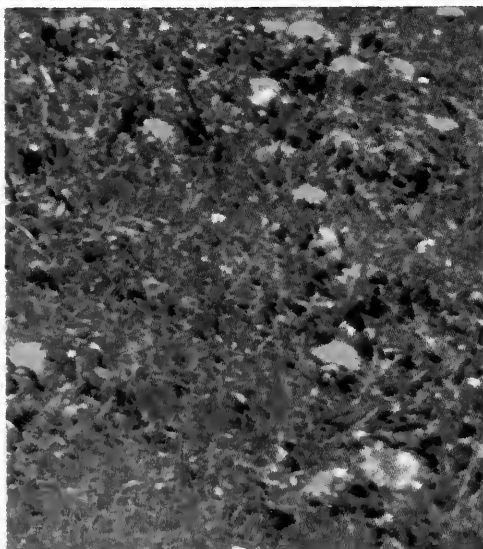


Fig. 12. A lawn before and after treatment with a herbicide.

Crabgrass

Crabgrass is the main "grassy" or narrow-leaved weed of lawns and requires judicious use of herbicides. These are available for both preemergence and postemergence treatments.

Preemergence herbicides	Postemergence herbicides
bensulide (Betasan)	organic arsenates
chlorthal (Dacthal)	
siduron (Tupersan)	
trifluralin (Treflan)	

Diseases

Good maintenance practices help to prevent disease outbreaks. Complete loss of a lawn rarely occurs and so preventive spraying is unnecessary. If small areas are killed by disease, prepare them immediately for seeding or sodding to prevent weed invasion. Apart from British Columbia, turf losses from winter diseases are greater than those from summer diseases. Turf damage from snow molds, low temperatures and desiccation, and fairy rings occur in all of Canada. Powdery mildew, leaf spot (melting out), brown patch, rust, red thread, and slime mold occur locally and with less frequency. When serious disease infection occurs, seek local advice concerning the identification of the problem and the control methods by the appropriate fungicide.

Snow mold

Snow mold is the most troublesome disease of lawns in Canada and is caused by several different low-temperature fungi. The snow mold experienced in the Prairie Provinces differs from that encountered in Eastern Canada. It is most conspicuous in the spring when the snow is melting. Lawn areas become covered with a cottony growth and in severe cases the grass is killed. When the areas are first visible after the snow melts, rake or brush the matted infected grass to aid recovery.

Fairy ring

Fairy ring effects are readily recognized as arcs or continuous circles of dark green turf. The dark green circular band is 5–30 cm wide, and the diameter of the circles is 1–30 m. Mushrooms or toad stools, the fruiting bodies, appear in the bands during periods of abundant moisture. These circular rings enlarge year by year. Fairy ring is caused by fungi growing on decaying organic materials below the soil surface. Perforating the hardened soil surface of the ring with a garden fork and thoroughly soaking the area with water tends to alleviate the situation. Turf recovery may also be helped by fertilization. No known fungicide will effect a cure.

Powdery mildew

In humid weather powdery mildew fungi invade grass located in shade and other areas where air circulation is poor. At first the upper sides of the leaves become coated with a gray white cobwebby growth. Eventually the leaves are covered and sizeable lawn areas appear white. In later stages the leaves may turn pale yellow. Powdery mildew is not fatal to the grass and will disappear after mowing and the return of less humid conditions. Judicious tree pruning to improve air circulation helps to reduce mildew infection. Suitable fungicides are available to control serious or repetitive outbreaks.

Leaf spot

Leaf spot is most active during the cool, moist growing conditions of spring and fall. Kentucky bluegrass is the most susceptible species. The turf develops a brown or yellowish tinge and the leaf blades have small purple black lesions. Light infections disappear without turf damage when warm, dry weather returns. Prolonged cold and moist conditions promote severe disease outbreaks. Leaf spot can be controlled with the proper fungicide.

Other diseases

Brown patch (of bentgrasses, bluegrasses, and ryegrasses), rust (of bluegrasses and ryegrasses), and red thread (of fescues) are mid-summer diseases that can invade the home lawn. Persistent heavy infections can severely damage turf but can be controlled by the appropriate fungicide. Slime mold may appear on lawns occasionally during warm, moist weather. It is usually seen first as bluish white or gray slimy masses that cling to the grass blades. Later the masses form blue gray powdery structures. Slime mold does little actual damage and can be swept from the turf when encountered.

Pests

There are several pests that can devastate a lawn if they occur in sufficient numbers. Maintenance practices or chemicals are available for control. Seek local assistance to identify the pest and to obtain control recommendations. Because chemicals are poisonous, keep all containers away from children and pets and take precautions for their safe disposal. Be sure to wash your hands carefully after using any chemical.

Earthworms

Earthworms can be troublesome because their casts are deposited near or at the soil surface and create a rough lawn, which is uncomfortable to walk on. The raised areas become compacted and may be scalped by the mower; the turf becomes weak and subject to weed invasion. This problem is more prevalent with turf established on

clays and clay loams. Earthworm casts are seldom a problem with light soils. The remedy is to rent a vertical lawn mower or dethatching machine in the spring and operate it across the lawn in both directions. This treatment will spread the casts, rejuvenate the turf, and help the lawn to recover quickly. Rake up and remove the debris.

White grubs

White grubs are the larvae of the June beetle. The grubs feed on the roots of lawn grasses. A large number of grubs can ruin a lawn in a short time. Because insect populations tend to build up in dry, warm summers, grub-damaged lawns may go unnoticed until late summer. When first hatched the grubs are small, but at maturity they may be 3 cm long. They are usually found in the soil in a curled position and have brown heads and white bodies. When turf losses are light, dig up the soil and remove all the grubs in the surface 8 cm. Then firm and seed or sod the area. Where sizeable areas are damaged, treat them chemically to kill the grubs and then cultivate and seed or sod them.

Other pests

In some regions chinch bugs and sod webworms may attack lawns. During prolonged hot, dry summer periods these pests are extremely active. Small lawn areas that are lost can be renovated and reestablished. When large areas are affected, use an insecticide treatment. Then try to reestablish the right lawn grasses. Ants are frequently troublesome in sandy soils, particularly where the turf is thin, such as alongside household paths and driveways. Improve soil conditions and thicken turf stands by using water, seed, and fertilizer.

NOTES ON LAWN GRASSES

In recent years turf grass breeding programs around the world have introduced many new, improved cultivars. Most have been field tested in Canada and many are now licensed for sale. Check locally for those that have performed best and meet your requirements. For a suitable lawn throughout most of Canada use a mixture of Kentucky bluegrass and red fescue. The proportions of these species in the mixture will depend on the location and use. In Eastern Canada and British Columbia a companion species is frequently included in the mixture to provide a cover quickly while the permanent species germinate and establish themselves. For watered lawns in the Prairie Provinces, simple Kentucky bluegrass-fescue mixtures are used. Where supplemental water is not available in this area, special dryland grass species are used. In coastal British Columbia red fescue-bentgrass mixtures also perform well. When Kentucky bluegrass is the only permanent species required, use two or three improved cultivars in a mixture rather than one cultivar only. Plant other species for special uses or problem areas such as shade and dry and infertile soils.



Fig. 13. Improved cultivars in a mixture for home lawns.

Kentucky bluegrass

Kentucky bluegrass, *Poa pratensis*, is the most widely adapted of all lawn grasses and the basis of most successful mixtures in Canada. This is a hardy, durable grass with boat-tip leaf blades; it spreads rapidly by rhizomes and is particularly adapted to open fertile soils. Kentucky bluegrass withstands heavy use better than all other lawn grasses. New selections have a rich green color, good adaptation, and disease resistance. Nugget is a cultivar that has shown some shade tolerance. In the following list, cultivars that are licensed for sale in Canada are included with their countries of origin:

Banff—Canada	Merion—USA
Baron—Netherlands	Nugget—USA
Birka—Sweden	Park—USA
Bono—Norway	Prato—Netherlands
Bristol—USA	Primo—Sweden
Cheri—Sweden	Sydsport—Netherlands
Dormie—Canada	Touchdown—USA
Fylking—Sweden	Victa—USA
Geronimo—Netherlands	Windsor—USA
Majestic—USA	

Creeping red fescue

Creeping red fescue, *Festuca rubra* var. *rubra*, grows better than most grasses on poor, dry soils and in shade. It spreads by rhizomes, produces a fine, uniform turf, and blends well with Kentucky bluegrass. Creeping red fescue requires less nitrogen and water for growth than Kentucky bluegrass. Improved cultivars:

Boreal—Canada	Pennlawn—USA
Dawson—England	Reptans—Sweden
Durlawn—Canada	

Chewings fescue

Chewings fescue, *Festuca rubra* var. *commutata*, is very similar to creeping red fescue but does not spread by rhizomes. Chewings fescue, creeping red fescue, and hard fescue are often referred to as the fine fescues because of the fineness of the leaves. Recent improved cultivars:

Highlight—Netherlands	Koket—Netherlands
Jamestown—USA	Menuet—Netherlands

Hard fescue

Hard fescue, *Festuca ovina* var. *duriuscula*, is a cool season species that has more drought resistance than creeping red fescue. It is a tufted grass and does not have rhizomes. Biljart is an improved cultivar, which originated in the Netherlands.

Perennial ryegrass

Perennial ryegrass, *Lolium perenne*, is not hardy in many parts of Canada. It is used chiefly as a companion species with mixtures of Kentucky bluegrass and creeping red fescue because it germinates and establishes itself quickly. Perennial ryegrass can be used alone for a temporary lawn. Some improved cultivars:

Manhattan—USA	Pennfine—USA
Norlea—Canada	

Canada bluegrass

Canada bluegrass, *Poa compressa*, forms a very open, coarse turf and has an unattractive, light blue green color. Because of its resistance to drought, it can grow on poor, dry, sandy or gravelly soils and even on heavy clay soils. Do not use this grass for lawns in good growing areas. It is useful for parks, reclamation sites, or similar areas that receive minimal care.

Rough-stalked bluegrass

Rough-stalked bluegrass, *Poa trivialis*, is particularly adapted to moist, shady locations. The leaf blades are a light olive green. The species is not satisfactory for open, sunny areas.

Redtop

Redtop, *Agrostis alba*, is often used in lawn mixtures because it grows rapidly after seeding. It is adapted to imperfectly drained sites and acid soils. Redtop forms a coarse, open sod and spreads by rhizomes.

Bentgrasses

Bentgrasses, *Agrostis* spp., need special care and are not usually recommended for home lawns. They are used mostly for golf courses and bowling greens. Bentgrasses require frequent and close mowing, respond well to regular feeding and watering, and are very competitive. A reel mower and careful attention to disease control are needed. However, in coastal British Columbia bentgrasses are often recommended and used in some lawn mixtures.

Bentgrass in a well-kept Kentucky bluegrass lawn creates a special problem. The light color of bentgrass is not compatible with the darker Kentucky bluegrass. Bentgrass does not put out leaf blades until the stolons have good light and reach the full height of bluegrass. After the grass is mowed to a height of 6–7 cm, large brown patches of bentgrass appear and cause an unsightly lawn. It is presently impossible to control or remove bentgrass from bluegrass lawns after it becomes well established. When it first volunteers it may be controlled by completely removing crowns and roots. At this stage it appears as a small, circular, pale green patch in the lawn.

Other grasses

Russian wild ryegrass, *Elymus junceus*, and streambank wheatgrass, *Agropyron riparium*, are dryland species that are used either in pure stands or in mixtures with small amounts of Kentucky bluegrass for the Brown and Dark Brown soil zones of the Prairie Provinces. In these areas soil moisture is limited and watering may not be feasible.

Sheep fescue, *Festuca ovina*, is a blue green, narrow-leaved, drought-resistant species and is not suitable for most home lawns. It can be used on impoverished, dry, rocky sites where supplemental water is unavailable.

Tall fescue, *Festuca arundinacea*, is a wide-leaved species with wide soil adaptation, but it is not sufficiently hardy for many areas in Canada. It can best be used in mixtures for roadsides, playing fields, and parks in mild areas.



Fig. 14. Bentgrass on a home putting green.

Annual bluegrass, *Poa annua*, often invades compacted areas of a home lawn but is poor as a lawn species because of its pale green color and unreliability.

Timothy, *Phleum pratense*, orchardgrass, *Dactylis glomerata*, meadow fescue, *Festuca elatior*, and alsike clover, *Trifolium hybridum*, are forage species and should not be included in lawn mixtures.

You may add up to 5% white clover, *Trifolium repens*, to lawn mixtures for open sunny locations, but it is not necessary.

Fertilizer guide

Fertilizer, %			Amount per application, kg/100 m ²
Total nitrogen (N)	Available phosphoric acid (P ₂ O ₅)	Soluble potash (K ₂ O)	
7	7	7	6.8
10	6	4	4.9
14	4	8	3.4
18	6	9	2.7
20	5	10	2.4
26	3	3	1.8
32	4	8	1.5

Guide for lawn mixtures

Region and conditions	Percentage by weight of grass seed	Seeding rate, kg/100 m ²
EASTERN CANADA		
Open, sandy soils with adequate moisture	30 Kentucky bluegrass, 60 creeping red fescue, 10 redtop	1.5
	35 Kentucky bluegrass, 50 creeping red fescue, 15 perennial ryegrass	1.5
Open, loam and clay soils with adequate moisture	80 Kentucky bluegrass, 20 creeping red fescue	1.5
	60 Kentucky bluegrass, 30 creeping red fescue, 10 perennial ryegrass	1.5
Moist shaded areas	30 Kentucky bluegrass, 10 creeping red fescue, 20 redtop, 40 rough-stalked bluegrass	2.0
Dry shaded areas	20 Kentucky bluegrass, 65 creeping red fescue, 15 redtop	2.0
PRAIRIE PROVINCES		
Open with supplemental water Manitoba Saskatchewan Alberta	70 Kentucky bluegrass, 30 creeping red fescue	2.2
	50 Kentucky bluegrass, 50 creeping red fescue	2.2
	50 Kentucky bluegrass, 50 creeping red fescue	2.2

No supplemental water Manitoba Saskatchewan, prairie	100 creeping red fescue	2.5
	100 Russian wild ryegrass	2.5
	100 streambank wheatgrass	2.5
	20 creeping red fescue, 80 Russian wild ryegrass	2.5
	20 creeping red fescue, 80 streambank wheatgrass	2.5
Black soils parkland Alberta	100 Kentucky bluegrass	2.0
	100 creeping red fescue	2.2
	100 crested wheatgrass	2.5
BRITISH COLUMBIA		
Coastal areas	80 creeping red fescue, 20 bentgrass	2.0
	30 Kentucky bluegrass, 60 creeping red fescue, 10 bentgrass	2.0
	35 Kentucky bluegrass, 65 creeping red fescue	2.2
	30 Kentucky bluegrass, 40 creeping red fescue, 30 perennial ryegrass	2.2
Southern interior, regular conditions dry conditions	60 Kentucky bluegrass, 40 creeping red fescue	2.2
	100 crested wheatgrass	2.5

Note: Select cultivars that perform best in your area. Where Kentucky bluegrass is seeded alone or with perennial ryegrass, select two or three cultivars rather than one.



